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REMARKS/ARGUMENTS

These remarks attend to all outstanding issues in the pending Office Action of August 4, 2005. Claims 1 - 21 remain pending in this application.

Claim Rejections – 35 U.S.C. § 103

The following is a quotation from the MPEP setting forth the three basic criteria that must be met to establish a *prima facie* case of obviousness:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. MPEP §2142, citing *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

2. Claim 1 stands rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,825,444 granted to Tuan et al. (hereinafter, "Tuan") in view of U.S. Patent No. 5,571,550 granted to Polny, Jr. (hereinafter, "Polny"). Applicant respectfully disagrees that Tuan and/or Polny, alone or in combination, render claim 1 obvious.

Tuan discloses a composition for and method of making conductive concrete for de-icing bridge surfaces. The conductive concrete is embedded with electrodes such that an applied voltage will resistively heat a conductive concrete slab (and, by conduction, melt any ice thereon).

Polny teaches an electroheating apparatus to continuously pasteurize or cook pumpable foods, specifically liquid egg. Polny's apparatus comprises two concentric electrodes forming a channel where liquid egg passes between the electrodes. The egg is resistively heated upon application of an AC current having a frequency "high enough to prevent electrolysis of the food lying between approximately 100 Hz and 450 kHz" (col. 12, lines 39-41).

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It has been held that a reference must either be in the field of an applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant is concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992).

Polny is classified in class 426, subclass 244 relating to food or edible material involving dielectric heating or passage of electric current through food material. The present application relates to the removal of ice from non-edible objects, such as windshields. Polny's food applications do not involve ice-water transformations; the only solid-liquid transformation mentioned is coagulation. Polny's food pasteurization apparatus and method constitute non-analogous art that is not in the field of the Applicant's endeavor. Further, Polny is concerned with proper pasteurization of food products to prevent food-borne diseases, such as salmonella infection (col. 8, lines 53-58). The present application addresses problems associated with damage caused by ice build-up (See "Statement of the Problem", Specification pp. 2-3). Polny is not reasonably pertinent to the problem with which the applicant is concerned.

Polny is also non-analogous art to Tuan and there is no motivation to combine the references as the Examiner has suggested: "It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize in Tuan a frequency greater than 1000 Hz and less than 300 KHz as taught by Polny in order to limit the heat applied to the heated object." Polny teaches frequencies suitable for avoiding electrolysis of food (col. 12, lines 39-41). One skilled in the art would not be motivated to utilize frequencies that avoid electrolysis of food (Polny) to de-ice a bridge surface (Tuan). We traverse the Examiner's use of Official Notice and request evidence as permitted by MPEP 2144.03(C).

In view of the remarks presented above, Applicant believes that claim 1 is allowable over Tuan in view of Polny. Reconsideration and withdraw of the rejection are respectfully requested.

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3. Claim 2 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Tuan in view of Polny and further in view of U.S. Patent No. 4,895,322 granted to Zieve (hereinafter, "Zieve").

Zieve is cited, presumably, because it discloses an AC power source providing an AC voltage of about 10 volts to 500 volts. However, nowhere does Zieve teach a system for melting interfacial ice. Rather, Zieve teaches a mechanical system, wherein "The current through the coil creates a magnetic field and establishes eddy currents in the thin metal skin of the aircraft wing. The repulsive force created between the coil and the wing...produces a rapid acceleration of the wing surface...This results in the ice which has been formed on the wing debonding from the wing surface and shattering away from the wing"(col. 3, line 64 - col. 4, line 6).

In addition to being non-analogous art to the present invention and Tuan, Polny is non-analogous art to Zieve. Food pastuerization is not in the same field as, or reasonably related to, removal of ice from an aircraft wing.

The teachings of Tuan, Polny and Zieve are incongruous, and there is no motivation to combine the references. One skilled in the art would not use an electrical voltage sufficient to *shatter* ice from an aircraft wing (Zieve), at a frequency sufficient to avoid electrolysis of food (Polny), to *melt* ice from a bridge surface (Tuan).

Given the remarks above, Applicant respectfully requests withdrawal of the Examiner's rejection, and further requests allowance of claim 2.

4. Claims 3, 6, 12-13, 15 and 16 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Tuan in view of Polny and further in view of U.S. Patent No. 4,732,351 granted to Bird (hereinafter, "Bird"). Applicant respectfully disagrees and traverses the rejection.

Bird teaches a mechanical device utilizing a piezoelectric material "which converts available electrical alternating current into mechanical force by realignment of its crystalline structures. This realignment causes the material to expand and retract in continuous motion and, thereby, prevents ice formation"(col. 4, lines 10-14). Bird discloses nothing of a system for melting interfacial ice; indeed, Bird specifies that the

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device "does not have to raise the temperature of the surface to the melting point of ice"(col. 3, lines 65-67).

Claims 3, 6, 12-13, 15 and 16 depend from claim 1, and benefit from arguments presented above. It is further submitted that Bird is non-analogous art to Polny, and that claims 3, 6, 12-13, 15 and 16 have additional features that patentably distinguish over Tuan, Polny and Bird. For example, with regard to claim 3, the Examiner states, "Bird discloses an electrical insulator (12) located in the interelectrode space (Fig. 3, between electrodes 34 and 36)." Respectfully, we disagree. Bird does not disclose an electrical insulator. He discloses a piezoelectric material (col. 4, lines 57-59) that receives and transmits voltages; thus piezoelectric material (12) is a conductor. The combination of Tuan, Polny and Bird fails to disclose every element of Applicant's claim 3. Claim 6 recites a system wherein the interfacial ice is located in the interelectrode space. The interelectrode space of Tuan is occupied by concrete, the interelectrode space of Polny is occupied by egg, and the interelectrode space of Bird is occupied by a piezoelectric material. The references, alone or in combination, fail to teach or suggest that interfacial ice is located in the interelectrode space. Claim 12 recites a system wherein the first electrode comprises a transparent conductive metal oxide. None of the references discloses an electrode comprised of a transparent conductive metal oxide. Claims 13 and 15 recite that either the first electrode or the second electrode may comprise a conductive grid. Tuan teaches parallel electrodes (Fig. 2; 24, 26), Polny teaches concentric electrodes (Fig. 2; 20, 50), and Bird teaches perpendicular electrodes on alternate surfaces of a material (Fig. 3; 34, 36). None of these arrangements constitutes a single electrode forming a conductive grid. Claim 16 recites a system wherein the first and second electrodes are interdigitated. None of the references teaches an interdigitated electrode configuration.

Tuan, Polny and Bird, alone or in combination, fail to teach every element of Applicant's claims 3, 6, 12-13, 15 or 16. For at least this reason, Tuan, Polny and Bird fail to render Applicant's claims obvious. Withdrawal of the rejection and allowance of claims 3, 6, 12-13, 15 and 16 is requested.

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5. Claims 7-9 stand rejected under U.S.C. §103(a) as being unpatentable over Tuan in view of Polny and further in view of U.S. Patent No. 6,239,601 granted to Weinstein (hereinafter, "Weinstein"). Weinstein teaches a "thickness measurement device and method that determines the thickness of a layer of ice" (col. 1, lines 55-56).

Claims 7-9 depend from claim 1, and benefit from arguments presented above. In addition to being non-analogous art to the present invention and Tuan, Polny is non-analogous art to Weinstein. Polny does not relate to ice applications.

The Examiner cites Weinstein, stating that Weinstein discloses an interelectrode distance having a value of about 50 μm to about 500 μm . However, there is no motivation to modify Tuan to utilize an interelectrode distance of about from 50 μm to 500 μm . Tuan states, "The placement of the electrodes is preferably near the horizontal edges of the concrete slabs, approximately four to six feet apart" (col. 15, lines 22-24; see also col. 7, lines 16-18). It would be unnecessary, time consuming and expensive to create Tuan's concrete slabs with electrodes precisely placed at interelectrode distances of about from 50 μm to 500 μm .

Further, Weinstein teaches away from the frequency range recited in claim 1, from which claims 7-9 depend. The presently claimed frequency range is selected based on the physical constants of ice, where the dielectric constant of ice is large (so that electric flux density will concentrate in the ice) and where ice is highly conductive. Weinstein's Figures 5 and 6 show an area between 400 Hz and 20,000 Hz where the dielectric constant of ice is high and the conductivity of ice is also high. However, Weinstein teaches the use of "two predetermined frequencies...selected in the same range where the dielectric constant and the relative conductivity of ice vary only slightly. For example, frequencies f_1 and f_2 may both be selected in the same range below approximately 400 Hz, or alternatively both in the same range above approximately 20,000 Hz." (col. 5, line 65 to col. 6, line 3). Thus, Weinstein teaches the avoidance of frequencies within the claimed range.

Applicant respectfully requests withdrawal of the rejection, and further requests allowance of claims 7-9.

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6. Claim 18 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Tuan in view of Weinstein.

As argued above, there is no motivation to modify Tuan to utilize an interelectrode distance of about from 50 μm to 500 μm (Weinstein). Tuan teaches an interelectrode distance of approximately four to six feet apart (col. 15, lines 22-24; see also col. 7, lines 16-18) and it would be unnecessary, time consuming and expensive to create Tuan's concrete slabs with electrodes precisely placed at interelectrode distances of about from 50 μm to 500 μm .

Further, Weinstein teaches a "thickness measurement device and method that determines the thickness of a layer of ice" (col. 1, lines 55-56). Weinstein does not disclose a method for melting interfacial ice, nor does Weinstein disclose "an object to be protected from ice formation". In fact, Weinstein expects that his apparatus will be subject to ice formation, so that the thickness of the ice formed thereon can be measured.

Applicant believes that there is no motivation to combine Tuan and Weinstein and that these references, alone or in combination, fail to render claim 18 obvious. Reconsideration and allowance of claim 18 are respectfully requested.

7. Claims 19-20 stand rejected under 35 USC §103(a) as being unpatentable over Tuan in view of Weinstein and further in view of Polny. The Examiner submits that Tuan discloses substantially all features of the claimed invention except the step of applying an alternating electric field having a frequency greater than 1000 Hz and less than 300 kHz. We respectfully disagree.

Polny is non-analogous art to the present invention, Tuan, and Weinstein. Polny's frequency range is selected to prevent electrolysis of food, there is no motivation to use this range to measure or melt ice on a bridge, windshield, or other object. Additionally, Weinstein teaches that frequencies within the claimed range are to be avoided. See discussion under point 5 above. For at least these reasons, Tuan, Polny and Weinstein, alone or in any combination, fail to render Applicant's claims 19-20 obvious.

In light of the above remarks, withdrawal of the rejection, and allowance of claims 19-20 is requested.

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8. Claim 21 stands rejected under USC §103(a) as being unpatentable over Tuan in view of Weinstein and further in view of Zieve. Respectfully, Applicant disagrees and traverses the rejection. Claim 21 depends from claim 20, which recites a frequency range of about 1000 Hz to 300 KHz. Tuan, Weinstein and Zieve fail to teach the frequency range of claim 20, and any claims dependent thereon. For at least this reason, Tuan, Weinstein and Zieve, alone or in combination, fail to disclose every element of Applicant's claim 21. Withdrawal of the rejection and allowance of claim 21 is respectfully requested.

Allowable Subject Matter

9. Applicant thanks the Examiner for recognizing the allowable subject matter recited in claims 4, 10-11 and 17. Applicant submits that there are further reasons for allowance of these and all other claims not specifically referenced in the Office Action of August 4, 2005, or in the remarks contained herein.

Conclusion

The Examiner appears to have created rejections based on 'piecemeal' findings in individual references for each element of Applicant's claims, e.g., frequency range, voltage range, interelectrode distance. The piecemeal references lack motivation or suggestion for their combination, as well as relevance to the present invention or one another. The Court has held that "...every element of a claimed invention may often be found in the prior art. However, identification in the prior art of each individual part claimed is insufficient to defeat patentability of the whole claimed invention" *In re Rouffet*, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457 (Fed. Cir 1988).

Applicant believes that all claims are allowable, and respectfully solicits a Notice of Allowance. Should any issues remain, the Examiner is encouraged to telephone Curtis Vock at (720) 931-3011.

Authorization to charge fees associated with a Request for Continued Examination and a one month extension of time is submitted herewith. If any additional

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fee is deemed necessary in connection with this Response, please charge Deposit
Account No. 12-0600.

Respectfully submitted,
LATHROP & GAGE L.C.

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